

16. Notes on the Zebras and some Antelopes of Angola.

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(Plates I.-VIII.*)

PART I.

In the summer of 1918, Mr. P. Van der Byl and I, who had both for a long time been contemplating a trip to Angola to obtain specimens of the Great Sable Antelope, on the subject of which letters had from time to time been appearing in the 'Field' from the pen of Capt. H. F. Varian, were able to fulfil our intention.

We set out under very favourable auspices with the kind assistance of the British Museum (Nat. Hist.), and of Mr. Varian in Angola, to whom are due our grateful thanks for the attention he gave us and the unremitting care he took to insure the success of our enterprise. Unfortunately, Mr. Van der Byl, after spending six weeks up country, contracted malaria, which left him in such a condition that he found it necessary to return to the Kapango Mission Station in the Bihe District, whence, after a few weeks' convalescence, he reached the coast and went home.

Mr. Oldfield Thomas (P. Z. S. 1916, p. 298) had already described the Angolan Sable Antelope as a new subspecies from material provided by Capt. Varian, taking as his type a face-skin and a frontlet with horns. He was able to obtain the loan of a single skull for comparison, but owing to insufficient evidence did not feel justified at the time in making a new species. I was able to bring home complete specimens of each sex, including some sub-adult examples, and with this material to work upon, I feel less diffident in establishing its claim to specific rank, and I have the concurrence of Mr. Thomas in so doing.

There are certain remarkable modifications to be found in the skull, and these, coupled with the large size and immense horns of the males, the entirely black face, and the distinctive body-colour of the females, combine to make a very strong case.

The Angolan Sable also, although as far as present knowledge goes confined within narrow limits, appears to be completely and widely isolated by natural boundaries from true Sable.

The name *variani* that Mr. Thomas has chosen fits it well, for it is through the active interest of the distinguished Engineer of the Benguela Railway that this splendid Antelope, so far the finest in all Africa, has been brought to light.

* For explanation of the Plates, see p. 339.

In the following table the differences between the skulls of *Hippotragus niger* and *Hippotragus variani* are set forth :—

<i>H. niger.</i>	<i>H. variani.</i>
Face shorter and broader, the frontal field which gives rise to the horns being more prominently developed, with the bases of the horns directed more obliquely backwards.	Face longer and narrower, with less extensive frontal field and the bases of the horns rising nearly vertically and directly over the orbits.
Nasals shorter, their frontal extremities not reaching the plane of the ante-orbital processes.	Nasals longer, their frontal extremities reaching the plane of the ante-orbital processes.
Premaxillæ less spatulate.	Premaxillæ spatulate, with broadly flanged anterior margins.
Lacrymal depression scarcely defined.	Lacrymal depression clearly defined.
Orbits round.	Orbits oval, the vertical axis being longest.
Maxillæ showing a distinct groove running parallel to the inferior border of the nasals, and continued across the upper ends of the premaxillæ.	Maxillæ showing only faint traces of groove.
Tympanic bullæ small, with styliform process flattened and blade-like.	Tympanic bullæ large, with styliform process round, very small and spike-like.
Paroccipital processes wide, flattened, with posterior margins convex. Viewed from behind they curve slightly outwards, then downwards and inwards at their apices, a large portion of their posterior borders being on a level with the posterior face of the condyles.	Paroccipital processes narrow, with straight posterior margins and no lateral curvature, but having a strong forward and slight inward inclination. They are more forward in position, being almost wholly in advance of the condyles.
Foramen ovale large and oval.	Foramen ovale small and round.
Mesopterygoid fossa wide, triangular in shape, with its containing walls diverging from the basisphenoid downwards, the post-hamular margins forming everted flanges.	Mesopterygoid fossa narrow, with parallel walls.
Lateral fossæ wide.	Lateral fossæ narrower, being constricted by the inflation of the posterior ascending walls of the maxillæ.
Ascending wall of maxilla behind the tooth-row nearly vertical, and strongly carinated.	Ascending wall of maxilla behind the tooth-row obliquely directed with its surface inflated, and less carinated.
Posterior palatine notches in line with, or in front of the plane of the posterior edges of the last molars.	Posterior palatine notches behind the plane of the posterior edges of the last molars.
Teeth smaller.	Teeth larger.

The skull of *H. equinus* resembles that of *H. niger*, and differs from *H. variani* in the form and position of its paroccipital processes, in the open triangular outline of the mesopterygoid fossa, and in the vertical direction of the ascending walls of the maxillæ, which are laterally compressed and prominently carinated.

Comparative measurements in millimetres of skulls of the three species taken from the B.M. Coll. (N.H.).

	<i>niger</i> .	<i>variani</i> .	<i>equinus</i> .
Greatest length.....	438 (= 17 $\frac{1}{4}$ inches).	475 (= 18 $\frac{3}{4}$ inches).	470 (= 18 $\frac{1}{2}$ inches).
„ breadth	162	162	179
Summit of orbits to base of horn pedicles.....	51	41	43
Length of nasals.....	164	203	178
„ „ premaxillæ.....	120	164	132
Width across maxillary flanges.	60	71	65
„ of mesopterygoid fossa.	24	16	29
Length from anterior angle of mesopterygoid fossa to end of premaxillæ	235	275	257
Length of upper tooth-row	112	122	132

In comparing skins of *niger* with those of *variani*, the most striking differences are found in the females, for whereas in the males of the latter a greater intensification of colour is shown, in the females the colour is quite distinct.

In true Sable the prevailing colour of the females is a sombre brown, very old examples becoming almost as black as the males, but of a more rusty hue. In *variani* the females are of a brilliant golden-chestnut colour, and never assume the black livery of the males. A very old female may develop a deeper chestnut hue, but there is no suggestion of black, as is seen in young males while still in an adolescent stage.

General Description of H. variani.

Male. A massive upstanding Antelope, almost as large as *equinus* but not so high in the leg. The foreface is long and narrow, the forehead not so high and prominent as in *niger*, with immense horns rising perpendicularly from above the eyes and curving backwards in an individually variable arc. There is usually a wide outward sweep towards the tips; more rarely the horns are parallel throughout their length. They are much compressed laterally, with very strong annulations. A section through them taken 8" above the base measures roughly 3 $\frac{1}{2}$ " \times 2". The annulations have a tendency to become obliterated on their lateral surfaces centrally, especially on the inside. Good horns may measure 58", with girth 10 $\frac{1}{2}$ "; but a length of 64" has been recorded. The unannulated terminal portion is generally straight. For this reason, coupled with their perpendicular rise from the frontals, the ends of the horns, when the animal is standing erect, do not as a rule curve downwards, but are carried more or less parallel to the line of the back.

The ears are comparatively small in fully adult males. In young males and in the females the ears are larger.

The neck is full, short, massive, oval in section, and wedge-shaped from above downwards. The mane, which is full and

composed of rather soft crimped hairs, unlike those of *equinus* which are straight and brush-like, reaches to the middle of the back. The back itself is level and short, with immense breadth across the loins, and quarters wide, full, and round like those of a cobby horse.

The tail, which is crested along its dorsal surface, terminates at about the level of the hocks in a thin tuft.

The testes in fully adult males are very large, the scrotum being pear-shaped as in bovines.

Colour above intense glossy black, under parts and inside of thighs white. Forehead and foreface wholly black, having in some specimens a faint trace of the cheek-stripes indicated by a few buffish hairs. Lacrymal tufts with extension upwards in the form of a frontally converging whorl of hair to the level of the eyebrows, buff. Lower part of cheeks, chin, and lips creamy buff. Hair of inside of ears white with buff edges; back of ears tan. Mane black, with a few reddish-tan hairs on crown. Tail black, with reddish-tan hairs along its dorsal crest; tuft wholly black. A deep tan patch covering side and back of hocks, and a stripe of the same colour extending down back of forelegs to fetlocks. Legs otherwise black. Irides in old males light tawny or light brown, giving a goat-like expression to the eye.

Young males resemble females, but the prevailing body-colour is duller, being tawny and black in almost equal proportions. As the animal advances in age, the black predominates, spreading forwards from the neck, chest, and shoulders, along the flanks and on the quarters, the last part to change colour being the lumbar region of the back. Face black as in old males.

Females. Bright golden chestnut, lightly suffused with black on the flanks, due to a percentage of the hairs being tipped with black, and deepening to a dusky brown with a sprinkling of long tawny hairs along the under side of the neck and on the chest. Under parts, including inside of hams, white. Legs golden chestnut, with a broad dusky streak down centre of knees. Back of pasterns and coronary band black. A blackish-brown blaze down centre of face flanked by narrow indistinct cheek-stripes. Lacrymal tufts, inside ears, and sides of jaws buffy white, paling to white on lips and chin. Back of ears, crown, and forehead golden chestnut. Mane blackish brown, with an admixture of golden-chestnut hairs which replace the black on the crown and in rear of the withers. Tail-tuft deep brown. Irides brown.

Habitat. The Angolan Sable Antelope is found in the strip of country enclosed by the upper waters of the Quanza River and its eastern tributary the Luando, and it is also said on good authority to occur between that river and its western tributary the Kutatu, all three rising in the great central plateau that divides the Congo basin from that of the Zambesi. East of the Luando the country is dry, barren, and sandy, being known locally as the "hunger country," and all reports, both native and European, tend to prove that the range of the Sable does not spread beyond the

confines of these rivers and certainly not across the watershed. It is, therefore, very restricted as to locality, and this circumstance may account in part for its highly specialized development. Col. J. C. B. Statham, who in 1920 penetrated into this country from Malange in the north in quest of this Antelope, did not encounter it in any large numbers until he reached the region in which, in the autumn of 1918, I procured all my specimens: viz., some 70 miles south-east beyond the junction of the Quanza and Luando. The distance between these two rivers is about 30 miles, with a low, flat, ironstone ridge forming the divide, being steepest towards the Quanza, from which it is distant about 10 miles. The elevation of this country is roughly between 3000 feet and 4000 feet. The Sable here are mostly found on the Luando side of the watershed where several streams rise, such as the Luce, the Kaluando, the Dunde, and the Lusinge, the latter being salt and forming a group of salt-pans known to the natives as "Ochi-Songwe." This area is covered with an extensive bush-forest, having narrow plains bordering the rivers and strung out along the headwaters of the streams, and intervening here and there as round or oval openings, termed "dambos." The trees vary in density, but nowhere is it possible to see more than 300 yards ahead between their massed trunks. The undergrowth is light, consisting of little low seedlings of bush a few feet high, and a fine, soft, sparsely-growing grass, which is the principal food of the Sable. There are also extensive beds of a low leguminous plant with a dull pink flower on which the Sable occasionally browses, and numerous bulbs and tubers, with some very beautiful flowers. The ground is thickly carpeted with dead leaves, and studded at intervals with enormous termite mounds upon which grow trees and bushes. The soil is a sandy loam enriched with leaf-mould, giving place on the dambos to the usual sun-baked knobbly grey clay, where a hard, coarse grass grows which the Sable never seems to eat. They were partial to the denser parts of the forest, and especially where certain trees are abundant, probably several varieties of *Cassia*, including the graceful *Cassia occidentalis* and *Huapaca gossweileri*, a tree of stiff-set habit, having large, expanded, racket-shaped leaflets radiating from one stem like those of the horse-chestnut.

The numbers in a herd vary from about eight to twenty individuals, about half of them being bulls. Two young bulls are frequently to be met consorting together by themselves, always very shy and wary. They have probably been driven out of the herd by a jealous old bull. The sentinel of a herd was nearly always a young bull. They no doubt make the best guards from experience gained when running singly or in pairs in the forest. I never encountered an old bull by himself. In a small herd there is usually only one big black bull. In large herds there may be two and quite a number of young bulls ranging from sub-adult nearly black ones with half-developed upright horns to younger ones of a dusky-tawny colour.

The herds of Sable at this period of the year, viz. September to December, do not move about a great deal, and it was possible to walk a long distance of 8 or 10 miles through the forest without crossing a single fresh track, and yet within the circle so described two or three herds might be harbouring. As referred to above, they confined themselves to certain sections of forest which could always be recognized by the kind of trees of which it was composed, and the art of finding the Sable was a question of keeping within the limits of these trees.

Unless disturbed a herd remains in that section in which it has established its feeding and resting quarters. Grazing through the early morning till about 9 A.M., it wanders off to a denser patch, where it rests till about 3 P.M., the whole herd lying down rather scattered and often without a sentry.

No concise information relating to the breeding habits was obtainable, but no small calves were noticed running in the herds, and as the big bulls were all with the cows, it might be inferred that the autumn is the rutting season. One afternoon I had a herd under observation in some thick forest, and noticed the old bull apparently taking stock of his cows. He rounded them up one by one, driving each to the front, and then turned back to fetch another. His methods were rather autocratic, for he ran at the cow and butted her behind with the front of his horns if she was at all inclined to loiter. Having passed them all in review, he followed sedately in rear of his protégées.

The big bull is generally somewhere in the background, that is to windward, and it is difficult to see him—black among black shadows and the lattice of black tree-trunks. He spends a great deal of his time lying down, but often a great pair of curving horns rising directly above the undergrowth discloses his position. The brilliant chestnut cows, on the other hand, easily catch the eye. At intervals one or another, generally a young one, gets on its legs and begins to graze, and then lies down again on the same spot. At length all rise together as by a preconcerted signal, and wander off slowly grazing.

Their drinking habits were not noted, but as sufficient water was always obtainable from pools in the stream-beds in the high forest, it is probable that they drink regularly. They did not appear to go down to the Luando to drink.

The bulls have a habit of rubbing their great horns on the bark of saplings and small trees, the branches of which they break off. This action imparts to the horns a red tan colour, very beautiful in contrast with the velvety blackness of the skin. They also, after soiling, invariably scratch with their hind feet, *more canis*, cutting long grooves in the earth. The rubbed bark, broken branches, and sapling tops hanging head downwards from the stem by a strip of bark, together with furrows scratched in the soil, are a certain indication establishing the presence of Sable in distinction from Roan Antelope. The latter occasionally go through the same performance of scratching, but not so regularly

as the former, and do not break down branches with their horns. It takes some experience to distinguish between the spoor of the two species. Roan, however, have rather a longer hoof, with the toes sharply pointed and separated at the tips. It is also larger, if that of an old bull. Sable have a hoof wider at the heels with blunter toes, the outer toe in bulls being usually worn square at the tip. The spoor of herds is easy to distinguish, cow Sables having a neat triangular hoof resembling that of Waterbuck.

The Roan also do not frequent the same parts of the forest in which the Sable make their home, preferring the smaller, thinner, and more open tree-bush in the vicinity of the dambos, which are their feeding-grounds. Sable do not seem to care for the dambos, and when moving through the bush, usually make a detour inside the edge of the cover rather than face the open space, especially when alarmed. On first being disturbed they do not run far, but stop to look back from the shelter of any convenient thick cover, and if then not followed too hastily, will generally settle down, and may be disturbed several times without going far, leaving a sentry posted. But if one of their number has been shot, the herd will keep going a long distance, and clear out to another part of the forest. When wounded, a Sable is extremely wary and difficult to approach, and before lying down is careful to select a good position from which to guard its back tracks. In this country they have few natural enemies, such as lions or wild dogs.

The country is thinly populated, the villages of the natives, the Luimbe, being few and far between. They are a poor race, cultivate scarcely at all, and at the time of our visit were subsisting mainly upon wild fruits and honey. They had no cattle and very few sheep and goats, but a recent survey has pronounced the country suitable for ranching purposes, the fine quality of the herbage, coupled with the salt-licks, making ideal conditions for cattle raising. All these causes no doubt have combined to favour the development on special lines of the Great Sable.

The only other Ungulates observed in the country were Roan Antelopes, Reedbucks, Oribi, on the small plains, and a Grimm's Duiker, identified as *Sylvicapra grimmii leocoprostopus*, which were numerous in the forest. The fresh tracks of a troop of four Eland appeared for several days, but these were probably visitors to the salt-pans.

Adult Sable bulls have a peculiar pungent smell, which pervades the whole animal and clings to the skin for weeks after death, in spite of daily exposure to the sun and wind. It resembles a vegetable rather than an animal smell, and suggests the aroma of the bush itself, although not of any particular plant. They are also covered with several kinds of ticks, which are very numerous on the neck and shoulders, where the hair is worn thin in consequence. The younger bulls had fewer ticks and the cows fewer still.

Some measurements in inches of two adult bulls and one cow are given below:—

	(1) Old ad. ♂.	(2) Ad. ♂.	(3) Ad. ♀.
Head and body	80	88	75
Tail	21	21½	19
* Mean height at shoulder	53	55½	47
Girth behind shoulder	66½	64½	58
Length of head from crown to lip...	16½	—	—
Girth of neck at throat	29½	29	25
" " chest	49	48	39½
Length of ear from notch to tip ...	9½	10	9

- (1) A splendid old bull with very massive horns, 58" long and 10½" round their base.
- (2) A very big adult bull, with horns still growing and traces of tan on the top of the loins.
- (3) An adult cow that had probably given birth to several calves.

In conclusion, one is glad to remark that there is no reason why this splendid Antelope should not continue long to exist in its present environment. During three months spent in the locality I must have seen at least 100 individuals, forming several strong and flourishing herds, and measures have been taken by the Portuguese Government, at the instigation of Mr. Varian, to protect them.

The local native name is "Sumbakoloko."

REDUNCA ARUNDINUM† Bodd.

On comparing a number of skins of this Antelope from various localities as far as Lat. 10° S., which is approximately the limit of its known range, it is difficult to arrive at any positive conclusions. In the B. M. collection the skins from South Africa, Zululand, the Transvaal, and Southern Mozambique are greyer. A skin from N.E. Rhodesia and a series collected in Angola are more fulvous. The most pronounced fulvous skins are two collected by the Rudd Expedition—one from near Beira, and the other from Gorongosa District in P. E. Africa. A paler and greyer race has been described by Lord Rothschild (P. Z. S. 1907, p. 237) from Fort Jackson in N. Rhodesia. The Nyasaland race

* This measurement is taken by holding the foreleg perpendicularly under the animal, forcing it into the shoulder and then measuring from heel to top of withers. This method would give a mean height. The shoulder height of the animal when alive would probably give 1" more.

† *R. arundinum* occur in the Bahr-el-Ghazal Province of the Sudan in the neighbourhood of Dud Majok, N.E. of Wan. Along the Meshra-er-Rek-Wan road and westwards along all the tributaries of the Bahr-el-Ghazal River a small Bohor Reedbuck is common.

appears also to be greyer. There does not, therefore, seem to be a line of geographical progression from grey to fulvous in any given direction; but material on which to work is sadly deficient.

There are no differences to be detected in skulls from any of these places.

Body measurements in inches of an adult male Reedbuck from the Luando, Angola:—

Head and body	62
Tail	9½
Mean height at shoulder	38
Girth behind shoulder	41
Length of ear from notch to tip	6¾

A new Oribi.

OURBIA RUTILUS, sp. n.

A beautiful Oribi, distinguished by its brilliant colour, wavy or curly hair, and the obsolescence of the bare patch below the ear.

Skin.—Colour of upper parts uniform tawny orange, changing abruptly to white underneath. The white area extends higher on the flanks than usual. Inside of ears, superciliary stripe, lips, chin, and throat white. Back of forelegs, hoofs, and of hindlegs to hocks white. There remains a slight trace only of the usual round subauricular patch, this area being almost completely covered with fine, short, buffish hairs. Tail black and very short, about 30 mm. Skull rather long and narrow, with long nasals, flat straight profile, and comparatively shallow lacrymal pits. Dimensions of typical skull: length 177 mm., breadth 75 mm., nasals 67 mm., upper tooth-row 52 mm.

Hab. The country between the Quanza and Luando Rivers, Angola.

Type. Ad. ♂, skin and skull, B.M. no. 20.4.27.40. Collected and presented by G. Blaine.

There are six specimens of this Oribi in the B. M. collection from the above locality—two males and four females, all adult, shot by the writer in the autumn of 1919. They are remarkably uniform in colour, one specimen only, a female, differing from the rest in having a blackish patch on the crown. In one character, viz. the suppression of the subauricular patch, they show some affinity to the Cape Oribi, but have much shorter tails, so short, in fact, as to be almost rudimentary. *O. hastata* from Nyasaland has a pronounced bare subauricular patch. Neither has the long curly hair and brilliant colouring of this species.

In comparing skulls, those of Oribis from the Cape are relatively shorter and broader, with short nasals; those from Rhodesia and Nyasaland are longer and narrower, with long nasals. The skulls of *O. rutilus* approximate the latter, but are straighter in profile than either and have shallower lacrymal pits.

Comparative skull measurements in millimetres :—

	B.M. No.	Length.	Breadth.	Nasals.	Tooth-row.
Oribi (Cape).....	135 a	165	77	53	50
				(approx.).	
Oribi (Rhodesia).	12.5.10.2.	168	72	60	51
<i>hastata</i>	13.9.5.4.	176	77	65	53
<i>rutilus</i>	20.4.27.40.	177	75	67	52

Oribis have peculiar inguinal glands, and in these Angolan Oribis they were very noticeable. They are covered at the sides by a modified pouch, consisting of a pair of flaps of tough parchment-like granular skin with serrated edges, sparsely covered with coarse white hairs and enveloping the genital organs of the male and the mammae of the female. The female seems to show a greater development of this curious growth than the male.

This peculiarity is briefly referred to by Roosevelt in 'African Game Animals,' ii. p. 555, as follows :—"At the groin are a pair of deep inguinal sacs marked by a growth of long peculiar pithy hairs."

Pocock*, in describing these inguinal glands in *Ourebia*, gives examples of their variation in the different races of that genus, notably in *nigricaudata*, *montana*, and *ourebi*.

Since my observations of these glands in the case of *rutilus* differ in some respects from his descriptions, it is probable that this variability is characteristic of the genus.

SYLVICAPRA GRIMMI LEUCOPROSOPUS.

O. Neumann, Sitz. Ges. Nat. Freunde, 1899, p. 18.

In my collection of Antelopes from Angola I brought back seven specimens of a Grimm's Duiker from the country between the Quanza and Luando Rivers. These have been found to agree best with Herr O. Neumann's description of his *leucoprosopus*, which he thought might have come from the interior of Angola, and in this supposition he was probably correct. He describes as his type a male living with a female in the Berlin Zoological Gardens. The female he referred to *Cephalophus altifrons* (= *ocularis*) Peters from Mozambique or to *flavescens* Lorenz from Matabeleland as being greyish brown in colour with less white on the under parts. But he gives a very full and careful description of the male, to which the above specimens conform most accurately, and especially touching the masked or spectacled appearance of the face viewed frontally, due to the white rings encircling the eyes.

There are two skins of *S. splendidulus* Gray and also a stuffed specimen in the B. M. collection, all from Angola. They represent

* P. Z. S. 1910, pp. 882-884; also A. M. N. H. 1918, p. 430.

a Duiker with the usual characters of *grimmi*. In one detail only are the above at variance with Neumann's description. He states that his Antelope was smaller than average *grimmi*, whereas the writer, who saw many of them in the open forest between the Quanza and Luando, considers that they were above the average size for this species. But the animal which he described was a menagerie specimen, and therefore unlikely to have attained a perfect development.

They are as richly and strikingly coloured as are the Oribi and the Great Sable Antelope that inhabit the same country.

A fœtus and a young female a few weeks old are greyer and more grizzled in colour, resembling the northern race *abyssinicus*, and show no traces of the white markings of the adults.

PART II.

Between Benguela and Mossamedes lies a wild desert region of rock, sand, and thorn-scrub, almost waterless and uninhabited save for the presence of nomad Baquando, half negroid, half bushmen, who roam over the country with their herds of goats, and a few Portuguese and native fishermen, existing from hand to mouth along the beach.

There is a deserted sugar factory at Equimina, its spacious and not unimposing façade rising above a close-set tangle of tropical bush and old overgrown gardens, near the middle of a wide and pleasant bay, one of the few places along this coast possessing a supply of good fresh water. At one time the site of a prosperous plantation employing considerable native labour, the place has now shrunk to a small untidy village harbouring an uncouth assortment of beach-combing blacks and two or three Portuguese fishermen.

In the next bay to the south, called Elephant Bay, distant 60 miles from Benguela, a whaling station has been established by a Norwegian company.

Mr. Tyler Thompson, an Englishman well known in Angola, has been in sole charge of this whaling station during the war, and it was here that I landed at midnight on December 20th, 1918, after four consecutive days and nights spent in an open fishing boat, tacking up against contrary winds from Benguela. It was some relief to disembark on the threshold of an Englishman in this otherwise inhospitable wilderness.

Mr. Thompson, being an old elephant hunter with an intimate knowledge of the game of the country, was able to give me much valuable help and information, and I am indebted to him for the success of my hunting excursions in this difficult country. A supply of good water in small barrels, and fresh fruit and

vegetables from his carefully tended garden at Equimina, sent up to my camps by relays of carriers, helped to smooth over many minor discomforts, and enabled me to look back upon this trip as one of the most interesting and delightful of my African adventures.

Without some elementary knowledge of geology, it is difficult to bare a description of a country whose outstanding features are bare rock and sand. Having very little, I must, therefore, be excused for a tentative and sketchy account of its outlines, which are so strange, wild, and rugged as to merit a description.

After passing the mouth of the Coporolla River below Dombe Grande, the littoral plain disappears, and gives place to high limestone cliffs alternating, as at Elephant Bay, with red sandstone. The coast-line here is indented with small bays bordering bush-covered sandy flats, which run inland for a space of 2 or 3 miles and are bounded by cliffs. Numerous dambas, or dry water-courses, debouch into these bays through steep defiles worn in the encircling walls of rock. Access to the country behind is only practicable up one of these dambas, as any attempt to climb to the top of the cliffs and thence proceed across country involves the surmounting of an appalling series of obstructions; but by plodding patiently along a damba through all its intricate windings, one is eventually rewarded by reaching a country where it is possible to follow the direction that one fancies.

The lower reaches of these dambas are contained by perpendicular walls of "pudding-stone" conglomerate. As they continue upwards, the cliffs give way to precipitous slopes of cretaceous rocks. Finally becoming shallower, they pass between undulating ridges covered with loose stone and shale, merging on to sandy flats, whence they break out into a network of dry water-courses.

At this point the terrain expands into many little plains which are more or less confluent, having a central nucleus traversed by an uninterrupted level stretch from 12 to 15 miles long. These plains spread laterally into irregular bays and gulfs, and send out long corridors through rocky defiles to end in dambas which lose themselves among the hills. Encompassing them on every side are steep stony ridges and conical kopjes built up of gneisses and mica-schists, with huge outcrops of white quartz occasionally crowning their summits.

A moraine of loose fragments of glistening white quartz litters the lower slopes between the hills. Elsewhere large surfaces of undulating ground are thickly spread with the same débris, which reflects a blinding glare from the pale metallic blue of the sky.

There are no trees to cover the nakedness of the land, but pale green thorn-bushes of the wait-a-bit variety, nearly all having hard hooked thorns, with some cactus and euphorbia, are dotted more or less evenly about this country, the peculiar features of

which in their wild disarray appeal strongly to the imagination. Here Pelion has been piled upon Ossa, there Ossa has heaved up and overthrown Pelion, so fantastically and in such confused masses do the hills range themselves or fall asunder into island groups and solitary kopjes in sandy wastes.

Some 50 miles inland from the coast and dominating all this region is a vast mountain rising in two great blocks from a sunken plain to a height of 5000 ft. or more. It is crowned with towering precipices of bare rock fluted with perpendicular fissures, while its flanks and base are covered with a downward-spreading forest of thick bush.

Owing to the restraint put upon my mobility by a crew of untrustworthy carriers who terminated their contract by running away, I was unable to reach this mountain, which would well have repaid a visit. It probably stood at the inland limit of the desert region.

There is no surface water, but by digging in some of the dambas it is possible to find water in certain places. Most of it is brackish and unfit to drink, and in the lower reaches of the dambas a brackish water often oozes out of the sand and trickles for a few hundred yards to be again absorbed. Water was, however, available from used water-holes near the two camps I made in this locality, the farthest one being in rock and contaminated by the Baquando goats and baboons that frequented it.

This is a hunter's paradise. To climb in the early morning to the topmost pinnacle of some hill selected for a wide range of view, to sit in the cool S.W. breeze as it streamed inland from the Atlantic and watch the sun rise over a shoulder of the great mountain, was an unforgettable experience. As the clear white light came slanting across the crests of the hills and began to radiate downwards on to the plains, every detail below, becoming illuminated, sprang clearly into view. At this time the game was all on the move, and could be detected with glasses 3 or 4 miles away. Below, in the foreground, delicate clean-cut Springbuck in open herds moved briskly between the bushes from tuft to tuft of grass, throwing long blue shadows across the cold, pale sand. Beyond, a solitary bull Gemsbuck, standing motionless as if carved out of stone, would suddenly spring into life, and with characteristic pendulum-like nodding of the head and smooth, rapid walk, join a herd of his kind already grazing on the edge of a dry water-course. Or the more bulky and indolent forms of a herd of large Mountain Zebra would be grouped in tones of pale gray and pinkish white among the thicker bushes clustered about some stony ravine. The sun, meanwhile soaring perceptibly higher above the crests of the lovely purple mass of the mountain, swept back the shadows into the farthest recesses of the landscape, changing the cold blue light of dawn into the sunny brightness of an African morning.

EQUUS HARTMANNÆ Matsch.

Equus hartmannæ Matschie Sitzber. Ges. Nat. Freunde, 1898, p. 174.

Equus penricei Thos. A. M. N. H. ser. 7, vol. vi. p. 465 (1900).

Most characteristic of this land of stones is this big Mountain Zebra, a fair cousin of the true Zebra of the Cape, now almost extinct.

Originally described by Matschie from Huanib and Uniab on the coast N. of Walfisch Bay, and later by Thomas from a specimen presented by Mr. G. W. Penrice from the Moninia River N.E. of Mossamedes, there can be little doubt that the two are one and the same animal. My specimens were collected near the coast at Elephant Bay, 100 miles N. of Mossamedes, and correspond accurately with Matschie's original description.

Habitat.

The home of this Zebra appears to be in the coastal belt of S.W. Africa where the country is rocky and precipitous. I have seen the spoor on the wet sand of the sea-shore at low tide, and have often watched them grazing on the low-lying flats and on the plateau-like tops of the adjacent cliffs within a mile of the sea. According to Mr. Tyler Thompson's observations, with which my own coincide, they do not penetrate further than 30 miles inland, and are strictly confined to the waterless desert region.

Description.

Skull.—A comparison of the skulls of *zebra* with *hartmannæ* shows slight differences only, the latter being more massive.

Zebra shows modifications of the frontal aspect between and below the orbits. There is a depression along the naso-frontal suture. The nasals also are depressed centrally, and the maxillæ are compressed laterally above the infra-orbital foramen.

Hartmannæ has the frontal profile straight, the nasals straight, and no lateral compression of the maxillæ in the region of the nasals.

In *zebra* in the flesh, the profile is dished or dented in between the rather prominent field of the forehead and the muzzle, as is seen in an Arab horse.

In *hartmannæ* the whole profile is flat with a descending muzzle, giving the head a Roman-nosed appearance.

There is also noticeable at the anterior end of the malar, near its junction with the maxilla, on the inferior surface of the malar-maxillary ridge and in line with the last molar, a roughened bony spur. This is not noticeable either in *zebra*, *quagga*, or *grevyi*, and has probably been developed for the attachment of a more powerful muscle to meet some special requirement of mastication.

Skin.—Direction of hair as in *zebra*. Resembles *zebra* in colour-pattern, except that the relative areas occupied by dark stripe and

light ground are reversed. Colour of stripes rusty liver-brown, darkening to sepia on neck and down legs to hoofs, where it forms a broad coronary band. On the top of the back, and notably in the lumbar region, the stripes are speckled with ochraceous hairs. Gridiron pattern fades into indistinct lines and spots as it approaches the tail; also down its basal third. Central dorsal stripe very narrow. Stripes down flanks taper to a point in line with elbow, leaving the chest, belly, and inside of thighs white. A broad band of sepia runs down centre of belly to chest. Ground-colour above a warm tone of ochraceous or sandy buff, paling below to buffy white. Centre of tail ochraceous buff, fading to white at sides. Tail tuft ragged and thin, buffy white above, changing to bistre at the end, the under hairs being black.

Head.—Stripes on forehead liver-brown, close and narrow with blurred edges, paling to warm sienna down face and on cheeks. Muzzle sienna. Ears as in *zebra* but more lightly marked, with brown tips. Mane striped dark brown and white, the dark stripes fading to bistre at the ends of the hairs, which are long and ragged, the longest measuring 7 inches.

The skin has a faded rusty appearance throughout. Chestnuts on forelegs large, smooth, and oval, measuring $4\frac{1}{2}$ inches by $3\frac{1}{3}$ inches. Hoof measuring $4\frac{1}{2}$ inches by $2\frac{1}{2}$ inches, both fore and hind being very similar. They are very hard. The frog shows only an outline, being worn quite smooth. The heels are long.

This Zebra is a massively built animal, considerably larger than the Bonte Quagga and approximating to a Grevy Zebra in size. The head is long and heavy, with a large muzzle. That of one old stallion I shot resembled a cart-horse, with deep pits above the eyes, Roman nose, and pendulous lower lip. The ears are large. There is in both sexes a dewlap 3 inches deep and commencing at about the same distance from the throttle. The loose skin of the dewlap is much thickened towards its apex, the whole of the skin of the neck increasing in thickness from above downwards. The end of the dewlap contains an indurated ball of flesh, about the size of a large walnut, lodged in fatty tissue which is adhesive to the skin. The neck is short and deep, the withers low, and the back level and rather long. The limbs are massive, with big bony knees and hocks and big cannon-bones.

In action this Zebra moves more freely than the Bonte Quagga, whose paces are short and lumbering. When suddenly startled, he gallops off with head carried high and nearly horizontal and neck arched backwards, but soon settles down to a slinging trot. At this pace the knees and hocks are well flexed. A herd in retreat always makes for the hills, up which they clamber with marvellous ease and surety over the roughest, stoniest ground.

The hills of this country are traced all over by their paths, so worn as to resemble native foot-tracks. It is only possible to get over some parts of the country by using the Zebra paths, and the main footpath along the coast between Dombe Grande and

Mossamedes is composed of their joined-up tracks. These Zebras do not run in large herds, eight being an average number in a herd. They graze in the mornings and afternoons on the tufted grass that grows on the plains and on the lower slopes of the hills, sheltering from the sun during the heat of the day under thorn-bushes, where they doze away the mid-day hours. They are not very watchful, nor does there appear to be a sentry in a herd, but when alarmed, they make off at once, and, unlike the Bonte Quagga, do not stop to look back until they have gone a long distance. They then retire up one of their numerous paths in single file, and then disappear over the sky-line into another part of the country. During the night they make their way towards the coast to drink at one of the rock-pools of brackish water in the lower reaches of some damba.

Mr. Tyler Thompson has described to me how, when first he went to Elephant Bay, the Zebras used nightly to drink at the fresh-water pool under the cliff. Led by an old stallion, the herd would come down at a gallop and halt just short of the water on the plain, while he would continue his career up the side of the cliff to take his stand upon some point of vantage overlooking the water. Having satisfied himself that no danger was present, he would signal "all clear" with a low neigh, when the herd would go down to the water. While they were drinking he would remain at his post, and descend to drink himself when they had all retired. No doubt this precaution was necessary, as lions had often been known to visit the bay at night. It is curious that most of the fresh water in this country is found at or near sea-level, and the water in the dambas, where it approaches the surface, may be fresh on one side and brackish on the other.

During the season of light rains when I was hunting in these parts, herds of the local race of Bonte Quagga (*Equus quagga antiquorum*) came down from the interior for the fine grass, and were often seen on the same plain with herds of *Equus zebra hartmannæ*, but never associating together. The latter do not go about in large herds, from six to twelve being the usual number, though as many as twenty have been seen together, which is unusual. Old stallions are often solitary.

Even at a distance the two species appear quite different: for whereas the Bonte Quagga is a conspicuous and by no means harmonious object, looking black or smoky grey against the prevailing tone of the country, this Zebra* never appears dark in any position in relation to the light, but always either white, pale grey, or reddish-sand colour. When standing against a background of rocks of which the prevailing tones are various shades of warm grey, the outline melts away and the whole animal looks transparent, the stripes dissolving into pale shadows.

* In a shot specimen of *Equus hartmannæ* the ground-colour of the dorsal surface was noticed to be exactly the same shade of pale reddish ochre as the sand on which it was lying.

The call of this Zebra is a low, snuffing neigh or whinny, quite unlike the oft-repeated hysterical "bwcha-bwcha" of Bonte Quagga. It also makes a loud squeal.

The flesh is fine-grained, with white fat and sinews, and by no means bad eating with a slightly sweet taste. That of the Bonte Quagga is coarse, rank, and unpalatable, in colour dark red with yellow fat and sinews.

Below are the body measurements in inches of two adult stallions:—

Head and body	* 99½	92
Tail	19½	21
Mean height at shoulder	52	54½
Girth behind shoulder	59½	60½
Length of head from crown to lip ...	28	27
Girth of neck at throat	30	30
" " chest	46	47
Ear { length	9	9
{ breadth	4	4

ANTIDORCAS.

On preparing to work out the Angolan Springbucks, the first difficulty to be encountered was the usual lack of material. Apart from the Angolan series, only two complete skins with skulls could be found in the B. M. collection, and one of these was a stuffed specimen. The remainder consisted of stuffed heads from the Selous collection and a few ancient relics without histories. There is, moreover, very little literature giving any detailed description of this Antelope for the reason that its highly-specialized character so readily distinguishes it from all others.

Harris † gives a careful description, and Brooke ‡ follows with another careful and accurate description, upon which I base the differences found in the Angolan series.

Even from the scrappy material available it is evident that two distinct races exist, the most obvious character of the one being the imperfect development of the horns in the female, which are small, thin, and indistinctly annulated, and of the other the fully-developed horns in the female, which are long, lyrate, and strongly annulated.

Other differences appear in the skulls, to which reference will be made later, but it is first necessary accurately to define typical *euchore*.

The best examples to be found representing anything approaching a series are four specimens from the Orange River

* Very old stallion.

† 'Wild Animals of Southern Africa,' 1840, pl. iii. Does with very slender horns either straight or capriciously bent, exhibiting a few indistinct annuli at their base.

‡ P. Z. S. 1872, p. 550. Horns in both sexes, but very small in female. *Hab.* S. Africa.

Colony, all shot by Mr. Selous—one an old male, stuffed, in the Public Gallery, and the other three stuffed heads of females from which the skulls have recently been removed.

A description of the heads will suffice, as the colour and its distribution on the bodies of Springbucks does not appear to vary.

The male has no trace of a triangular reddish-fawn patch on the forehead, the face being entirely white. The lateral cheek-stripes are distinct, but narrow and continued above the eyes to the bases of the horns. The ears are comparatively small, 146 mm. from notch to tip. The horns are basally stout, lyrate, and strongly annulated, having a perceptible spiral tendency which might be termed an interrupted spiral. They rise at an obtuse angle with the frontal plane, so that a line drawn perpendicularly through the centre of the orbits falls within their axis. The tips are hooked backwards and inwards.

Of the females, one is without the triangular fawn frontal patch. The other two show it pale and indistinct. Ear from notch to tip 133 mm. The horns are short, thin, nearly straight, and hooked either forward or forward and inward at the tips, with indistinct annulations.

In the male the skull is relatively short, wide, and deep, with horn-pedicles upright. The frontal profile is concave, with prominent ends to the nasals. The lacrymal pits are very deep. Basally the palatal surface is convex, and the basioccipital has greater breadth and length. The skulls of the females are similar in character.

Comparative measurements in millimetres of the skulls of male and female Springbucks from the Orange River Colony and from Angola:—

	O.R.C. ♂. B.M. no. 98.11. 28.8.	Angola ♂. B.M. no. 20.4.27. 32.	O.R.C. ♀. B.M. no. 19.7.15. 336.	Angola ♀. B.M. no. 20.4.27. 34.
Greatest length	220	240	220	223
„ breadth	95	105	99	95
Vertical depth.....	98	98	90	87
Nasals	75	87	73	83
Premaxille	71	79	76	77
Basioccipital surface	22 × 27	25 × 25	—	27 × 23
Upper tooth-row.....	65	70	63	65
Length of horns in inches...	12 $\frac{3}{4}$	13	7 $\frac{1}{2}$	11 $\frac{1}{8}$

A stuffed head of a male from N. Kalahari in the Selous collection resembles the Angolan Springbuck in size, length of face, and in having the frontal patch and the horns more nearly in line with the frontal plane. B.M. no. 19.7.15.333.

A female from N. Bechuanaland in the same collection shows the same characters as the above, and has long, straight horns, hooked slightly inwards at the tips, but not so perfectly annulated as in the Angolan females. B.M. no. 19.7.15.334.

Description of Angolan Springbuck.

ANTIDORCAS ANGOLENSIS, sp. n.

Larger than *euchore*, with longer, narrower head and axis of horns in line with frontal plane. In males, horns not so stout at base and, viewed laterally, less sinuous than in *euchore*. In females, horns long, perfectly developed and annulated, lyrate in form, with tips hooked inwards and backwards, and in all respects exact models of the male horns. Ears very large: of a male 165 mm., female 184 mm.

Colour as in *euchore*, but stronger and brighter throughout; the triangular frontal patch always present and edged below with bright mahogany-brown.

Skull relatively longer, narrower, and vertically less deep than in *euchore*, with straight frontal profile and shallower lacrymal pits. Horn-pedicles in line with frontal plane, so that a line drawn vertically through centre of orbits falls outside and in front of their axis. Basally palate not convex, basioccipital having equal or greater length than breadth.

Hab. The coastal region of Angola from Benguela southwards towards Damaraland.

Type. Adult female skin and skull: B.M. no. 20.4.27.34, collected by G. Blaine.

The Angolan Springbucks herein described were obtained from the coastal belt between Benguela and Mossamedes. The Coporollo River appears to be the approximate northern limit of their range, though a few stragglers have been seen, in some years, across the Benguela Railway. They roam in herds over the sandy flats, though never, I believe, in great concourses, grazing on the soft feathery grass that grows on the open flats, and nibbling the foliage of the thorn-bushes that line the courses of the sand-rivers, and are scattered on the stony approaches to the hills. They are also fond of frequenting the quartz-strewn wastes, where their bright, clear appearance and elegant outline is in lovely harmony with the glistening white stone and pale green vegetation.

The habits of Springbuck have been so often and so well described by naturalists and hunters, that it is unnecessary to add my observations to theirs. I am able, however, to record one fresh scrap of information which I believe to have escaped notice. In Angola the fawns are dropped in January. During the early part of that month, in 1919, I saw many Springbuck, the does being then heavy with young, but I did not see any fawns about. On the 12th of January, I went down to the coast, returning to my camp inland three weeks later. During that interval the does had dropped their fawns, and they were to be found lying about on stony ground in the open or under thorn-bushes, where their mothers had left them during the day. I once very nearly trod on one of these little creatures, huddled between some pieces of quartzite, for they lay very close until

detected. Although probably not more than ten days old, it jumped up and trotted off with characteristic stilty action, head erect and spread like an open fan. I followed and it cantered away, making miniature bounds in the air, in perfect mimicry of an adult Springbuck. I encountered several more during that day, and they all went through the same acrobatic performance, nor were any of the natives with me fleet enough to run one down.

Measurements in inches of an adult ♂ Springbuck are here given:—

Head and body	51 $\frac{1}{2}$
Tail	9 $\frac{1}{2}$
Height at shoulder	32
Girth behind shoulder	31
„ of neck at throat	14 $\frac{1}{2}$
„ „ chest	21 $\frac{1}{2}$
Length of ear	6 $\frac{1}{4}$ *

Besides Springbuck, the following Antelopes were seen within 20 miles of the coast:—Eland, Kudu, Gemsbuck (*Oryx gazella*), Steinbuck, Klipspringer, and Dik-Dik. Also Chapman's Zebra. Of these, the Eland and Chapman's Zebra were visitors that had wandered down from the interior, attracted by the fine green grass which had sprung up during the season of light intermittent rains that fall between the months of December and April. The remainder are regular denizens of this barren region.

ORYX GAZELLA.

Above all other Antelopes the Gemsbuck seems to embody the spirit of the African veldt. He is at home in vast shadeless spaces under a fiery sun, reared on the pale desert grass and sheltered by the scanty wait-a-bit thorn. The Kudu is more graceful, the Sable more magnificent, the Eland more stately, but the Gemsbuck has a character all his own. He is thoroughbred of the desert. His classic outline suggests some hunting scene depicted on an Assyrian bas-relief. Energy, strength, endurance are the key-notes of his conformation. His frame is massive without being heavy, and, although devoid of hollows and angles, does not carry an ounce of superfluous flesh and is supported upon light clean-boned limbs. The straight rapier-like horns, dark brilliant eye, and clean hard colour of the pelage, handsomely varied with black and white, go to form, in my estimation, one of the finest game animals in existence. This opinion I know is not generally shared by others who have seen this Antelope in its wild state. To me there is completeness both of character and appearance and such perfect adaptation to environment as always to draw my admiration.

* Ear of ♀ 7 inches.

The Gemsbuck has a small pouch of loose skin just below the junction of head and neck at the throat, which, like its neighbour the Mountain Zebra, contains a hard, round lump of fleshy matter. In the bulls the skin on the top of the neck is immensely thick, being as much as $1\frac{1}{2}$ to 2 inches through, thinning to about $\frac{1}{2}$ inch on the under side. The hair is short, hard, brittle, and shining—about the most perfect form of coat Nature could devise to resist the aggressive clinging wait-a-bit thorns, while the skin all over the upper parts of the body is tough and thick.

I see that Lord Rothschild has made this Gemsbuck into a new subspecies, and has been kind enough to attach my name thereto. His reasons for doing so are based upon its paler and greyer colour, and the reduced and partially interrupted areas occupied by the black markings in comparison with *Oryx gazella*.

The discovery of this new form tending in coloration towards *beisa* has caused him to consider that the straight-horned Oryx may now all be classified as local forms of one species. This is very interesting, and led me recently to visit the Zoological Gardens to get a close view of the Arabian Oryx deposited there by H.M. the King in 1920. I noticed that this Oryx appears to have the same pouch on the underside of the throat as *Oryx gazella*, only in a lesser degree. Neither *beisa*, *callotis*, nor *algazel*, the scimitar-horned Oryx, has this appendage.

The range of the Gemsbuck in Angola stops at the Coporollo River, north of which none have ever been seen. They are never, like the Kudu and the Mountain Zebra, found close to the sea, nor did I see their tracks in the dambas leading coastwards from the interior plains. They were not in large numbers in the neighbourhood of Elephant Bay during my visit, where I only saw a few herds and some solitary bulls.

All Oryx are naturally very wild, and these were no exception to the rule. They are great wanderers, and any suspicion of human presence causes them to leave the neighbourhood.

Although generally found on the flats where the best pasture was obtainable, they had no hesitation in climbing the hills, with which they were obviously well acquainted, for their tracks were to be found all over them along the Zebra paths.

One frequently came across little secluded flat basins high up among the rocks at a place where several dambas joined, where a herd of Gemsbuck had been resting, some lying down, and, judging by the quantity of droppings both old and fresh, these were favourite spots. In the heat of the day a whole herd would often lie down under a single thorn-bush. I have seen as many as ten so grouped. Solitary bulls are careful to select a bush in the open, and two or three may often be seen in the same plain lying each under his favourite bush, widely segregated from each other. Under certain isolated bushes the sand was always much trodden and scooped out, showing where Gemsbuck were in the habit of resting. Gemsbuck keep generally so far in the open away from

cover that they are difficult to stalk. Attempts to descend upon them from above down a hill-side generally resulted in failure, as they were very quick in spotting any movement above. When alarmed they get off the mark more rapidly than any other Antelope I know. Even when lying down they are up and away with the quickness of thought, but always stop to look round after going two or three hundred yards. The action is smooth, both in the trot and gallop, and close to the ground, with the nose stretched out, the horns thrown back, and the neck not appreciably raised. The heavily tufted tail streams out behind at the gallop, but when trotting is swished from side to side.

Gemsbuck are very keen-sighted, and when their suspicions are aroused will continue to stare steadily at the spot from which they sense danger with great persistency, and will detect the slightest movement behind any but dense cover. I remember one morning watching a herd, after grazing on some distant stony flats, wander off and take up a resting position on a shoulder connecting two quartz-topped kopjes which appeared to be very favourably situated for a stalk. After making a detour of several miles to approach one of the kopjes from a flank, I climbed to the top of the great white boulders and peered over into the pass immediately beneath. For the first moment I saw nothing but a stretch of glaring sand and some thorn-bushes. The next the whole herd magically leapt into view. Each member of it was standing perfectly motionless beneath me—most of them in the open, a few under bushes. They looked absolutely transparent, their outlines fusing into the reddish sand. Yet every detail was there, for they were very near. I have often before been struck by this curious effect, especially with Oryx. It appears to be due to the perfect toning of the body-colour with a background of sand or light stone, and to the fact that the black markings are exactly the same tone as the shadows thrown by any solid object under intensely bright shimmering light. For instance, the black markings of an Oryx standing under a thin thorn-bush through which the light penetrates, become so perfectly fused with the shadows thrown by the branches that it is impossible to detect, even with powerful field-glasses, where the solid marking leaves off and the shadow begins. This I have often tested.

The Gemsbuck cows in this country drop their calves in January. They are curious little creatures with large ears, short necks, and of a grizzled fawn-colour, and I remember once mistaking one that I saw in the distance cantering after its mother for a hunting-dog. The dark markings first appear in indistinct tones of greyish brown diffused about the areas, which are eventually occupied by the black bands in more concentrated form. The white markings on face and legs have not yet been assumed.

The bulls at this time are generally away from the herds. I counted two herds composed entirely of cows, one of sixteen and the other of ten.

Measurements in inches of adult bull and cow Gemsbuck are here given :—

	♂.	♀.
Head and body	79	74
Tail	19	18
Height at shoulder	46½	50
Girth behind shoulder	61	60
„ of neck at throat	30	25
„ „ chest	50	39
Length of ear.....	7¼	—

A Note on the Blue Buck (Cephalophus melanorheus).

At the Loanda Zoological Gardens were a male and female Blue Buck in a large paddock. The general colour of this pair was ash-grey with patches of a rusty tinge. The latter may have been due to a seasonal change of coat or to conditions of captivity.

Description.—Head darker than body. Rump not noticeably darker than body. Legs ash-brown. Tail fringed with white hairs, with the base and centre black.

This pair, which appeared to be rutting, were following one another about the enclosure, and were seen repeatedly to face one another and rub the facial suborbital glands together, with a stropping action, continued repeatedly, first on one side and then on the other.

EXPLANATION OF THE PLATES.

- PLATE I. *Hippotragus varians*: ad. ♂ skull in B.M. Coll. Length from occiput to end of gnathion 475 mm.
- PLATE II. *Hippotragus niger*: ad. ♂ skull in B.M. Coll. Length from occiput to end of gnathion 438 mm.
- PLATE III. *Hippotragus equinus*: ad. ♂ skull in B.M. Coll. Length from occiput to end of gnathion 470 mm.
- PLATE IV. Basal aspect of skulls of A *niger*, B *varians*, and C *equinus*, showing relative positions of *c, c*, condyles and *p, p*, paroccipital processes.
- PLATE V. A. The Angolan Sable Antelope.
B. Specimens of ♂ and ♀ Angolan Springbuck (stuffed) in the B.M. Coll.
- PLATE VI. A. Old stallion of Hartmann's Zebra, showing dewlap.
B. Dorsal view of Hartmann's Zebra, showing gridiron pattern.
- PLATE VII. A. *Antidorcas angolensis*: ad. ♂ skull in B.M. Coll.
B. *Antidorcas euchores*: ad. ♂ skull from the O.R.C. in B.M. Coll. *a'* and *b'*, basi-occipitals of above.
- PLATE VIII. A. *Antidorcas angolensis*: ad. ♀ skull in B.M. Coll.
B. *Antidorcas euchores*: ad. ♀ skull from the O.R.C. in B.M. Coll.
The above skulls (Pl. VIII.) are shown to too large a scale. They should appear smaller than those of the males shown on Pl. VII.